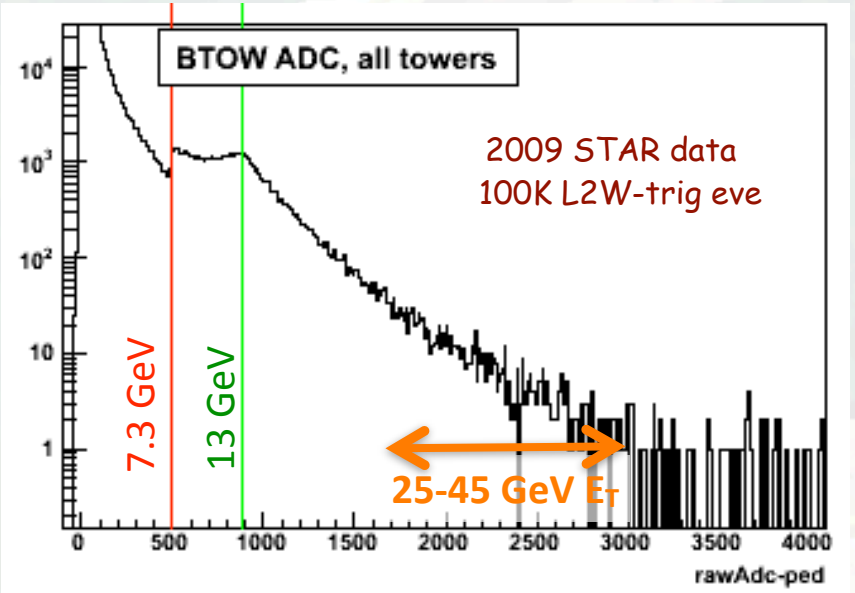
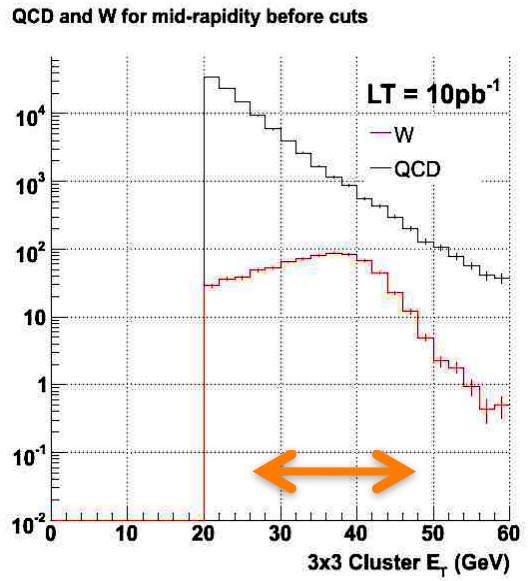
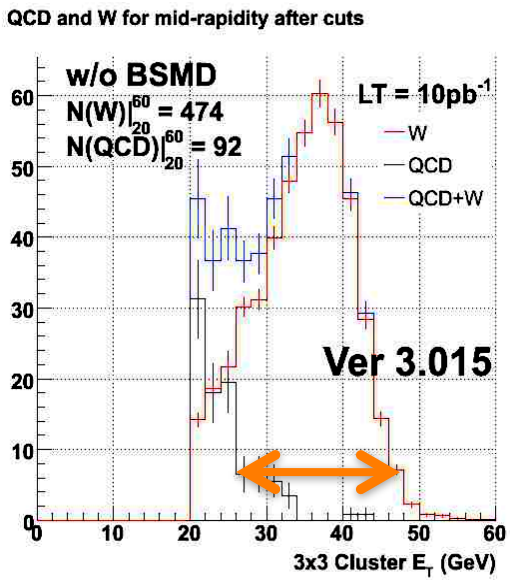
Run 9 - STAR status / concerns / issues

Run 9 500 GeV Status - W Trigger



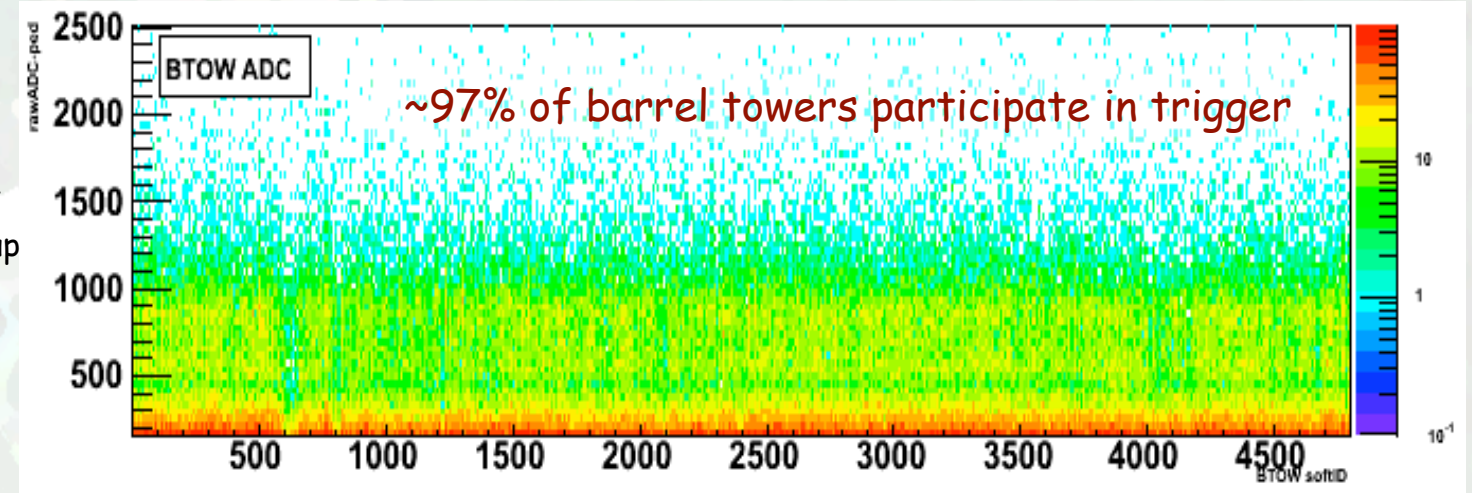




W-trigger: HT>7.3 GeV ET &
L2: 2x2 >13 GeV, 2-3Hz
Acquired since March 19
(longitudinal pol. @STAR) ~5.5pb^{-1}

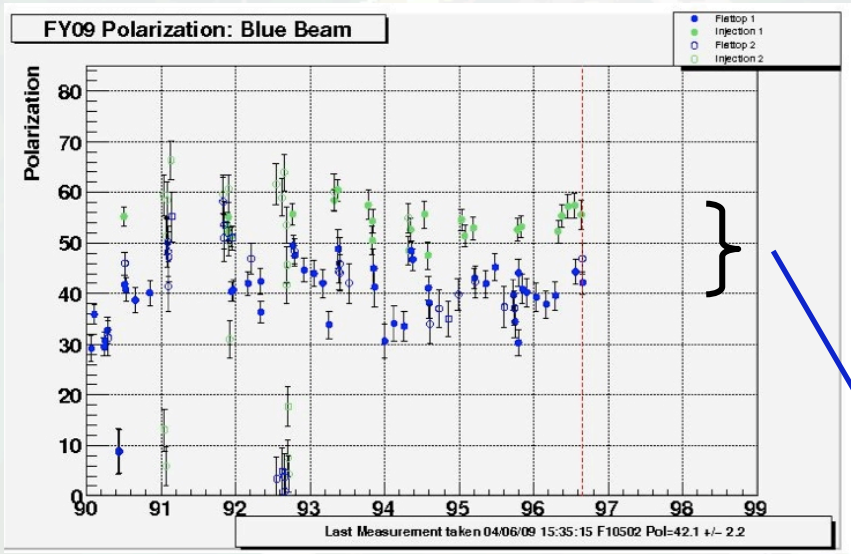
- ~68.5 hours of STAR DAQ up time w/ W-trigger
- ~441K W-trigger events

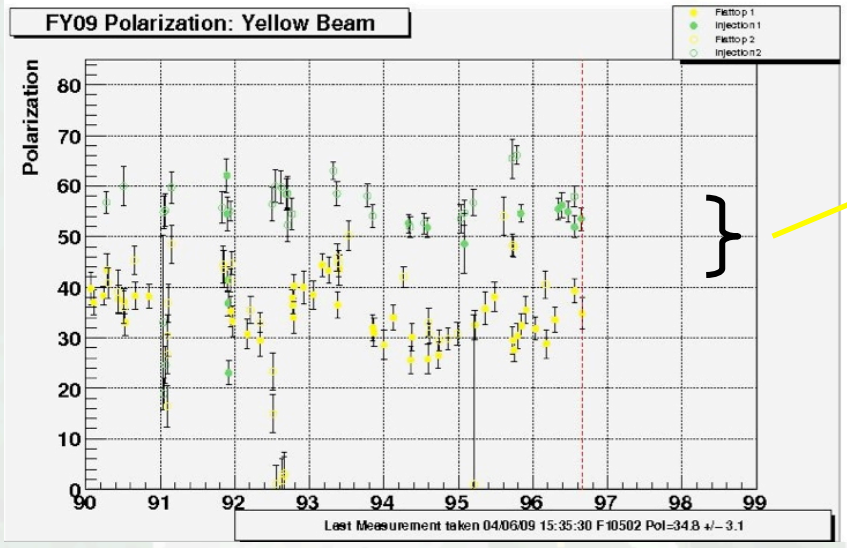
All events processed to muDst w/ crude TPC calibration



Run 9 - STAR status / concerns / issues

- Expectations on last week - Run 9 500GeV

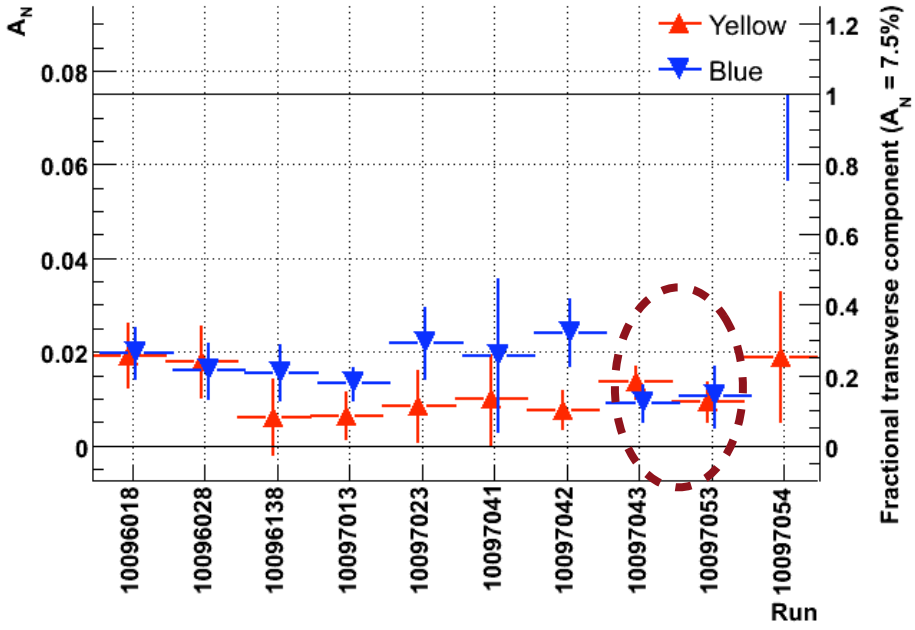


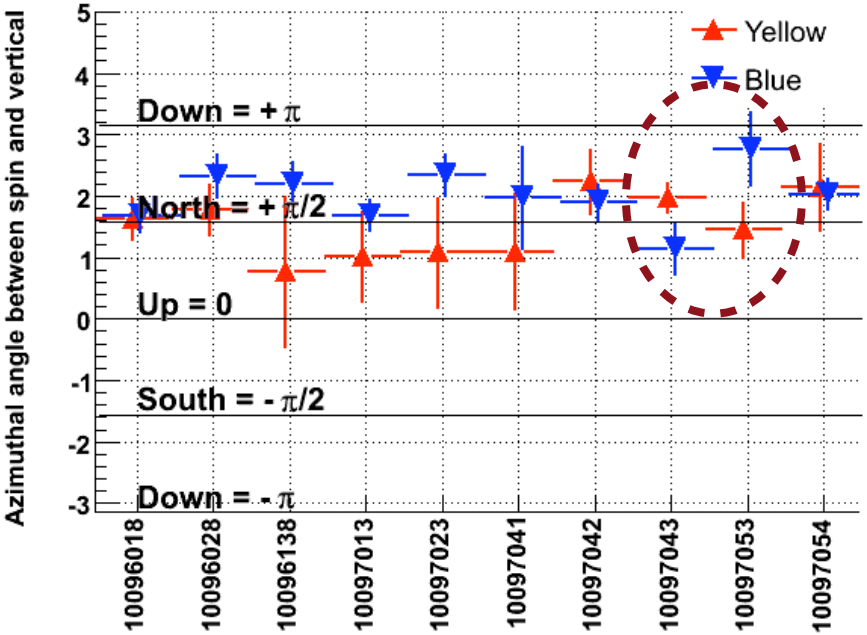


- Polarization at Injection in both beams: ~55%
- Important aspects for remaining 500GeV program:
  - Smooth running until ~April 13, 2009 in particular the last weekend
  - Need to address differences in polarization at injection and reported polarization at 250GeV in particular following the first release of H-Jet measurements - Support further development time!
  - Tuning of STAR spin rotators - Do we observe similar polarization lifetime issues similar to the situation after the PHENIX spin rotator tuning?

Run 9 - STAR status / concerns / issues

- Results of first spin rotator tuning





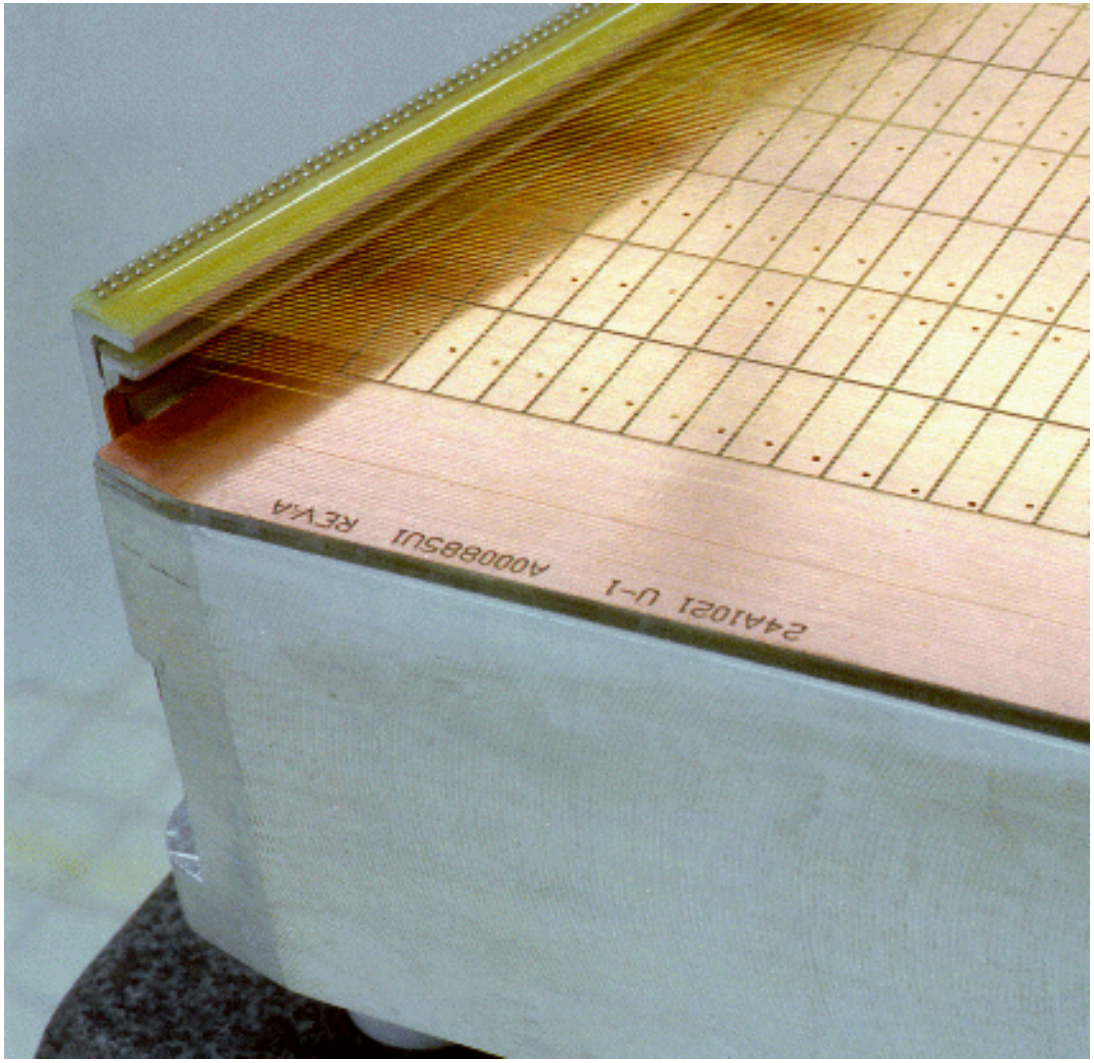
- Local polarimetry results indicate so far:
  - Fractional Transverse component: ⇒ Small change in Blue and essentially no change in Yellow
  - Azimuthal angle: ⇒ Not conclusive

Operation of the STAR TPC at High Luminosity
Lessons learned, so far

Jim Thomas

4/06/2009

TPC Anodes - detail



- **Gated Grid**
- **Ground Plane**
- **Anode Wires**
- **Pad Plane**

Sector Operation for 20:1 signal to noise with the original TPC electronics

Sector	gas gain	anode voltage
inner	3560	1170
outer	1310	1390

- **The pad response function and cluster finder were designed for 20:1 signal / noise**
- **Present experience is that Anode wires ‘trip’ at an unacceptable rate at current luminosities in pp500**

Good news and Bad News

- **The bad news is that the TPC inner sectors 'trip' too often at current luminosities … and we really hope to go to 4x $\mathcal{L}_{today}$**

- **The good news is that we can lower the voltage on the inner sectors to 1135 volts and the performance of the anodes is stable**

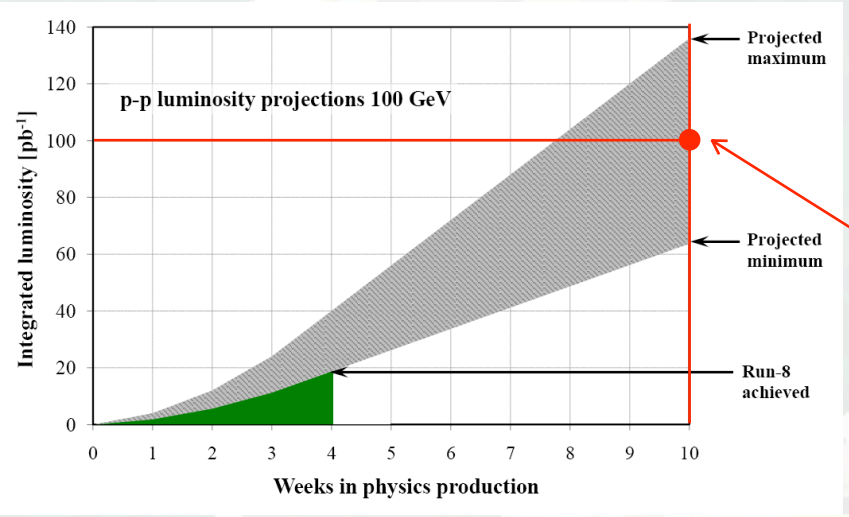
- **Last year, we installed new electronics (TPX). The S/N ratio for TPX is 30:1 … the spec for the original STAR TPC was 20:1**
  - **This suggests that we can lower the gain on both the inner and outer sectors by 1/3 and still achieve baseline performance.**
  - **The new voltages would be Inner: 1135 V Outer: 1345 V @ 66% gain**

- **We are proceeding conservatively and are running at 1135 / 1390 V**
  - **Performance is stable with today's luminosity and 100 Hz trigger rate**
  - **We are exploring lower voltage settings to see if further reductions are possible. We will be testing both tracking and dE/dx.**

The STAR TPC can handle today's pp500 luminosities.
Higher luminosities and trigger rates will require further study.

Run 9 - STAR status / concerns / issues

- Requirements for Run 9 200GeV program



Reach BUR goal in 10 weeks!

Assumption: FOM = $P^4 \cdot L \sim 6.5pb^{-1}$
$P \sim 0.6$ / $L_{delivered} \sim 100pb^{-1}$ $L_{recorded} \sim 50pb^{-1}$
Need: 10 weeks

- STAR 200GeV physics program requires a **~60%** beam polarization and a delivered luminosity of **~100pb^{-1}** in 10 weeks ($\Rightarrow$P ~ 50% would require $L_{recorded} \sim 100pb^{-1}$ to get FOM ~ $6.5pb^{-1}$)
- So far, Polarization at injection is below 60%! What is the strategy to optimize BOTH beam intensity / polarization (AGS) to yield a FOM of ~$6.5pb^{-1}$?